

LCA Documents, Vol. 8 – Announcement

Comparative Life Cycle Assessment of Three Insulation Materials: Stone Wool, Flax and Paper Wool

Final Report, August 2003 (Publication date: September 2003)

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Length: 144 pages

Price (print): Euro 32,00 / US \$ 32.00

Price (online): Euro 16,00 / US \$ 16.00

ISBN: 3-928379-60-7

Insulation of buildings is an important technology for saving heating and cooling energy and for a sustainable development. The comparative LCA study covers three insulation products applied for roof insulation. The products selected are based on HT stone wool representing traditional products – flax representing crop grown products and paper wool representing recycled products, respectively. Although the three materials have vastly different life cycles, they yet fulfil the same function; the methodology used should be of general interest.

In general, paper wool has the lowest global and regional environmental impacts, and flax insulation the highest, with stone wool falling in between. A notable exception is the total energy use, where stone wool has the lowest consumption followed by cellulose and flax. The study also addresses occupational health

issues using an approach similar to that for risk assessment. Here, the less bio-persistent HT stone wool products are seen to be the safest alternatives, because of a low potential for exposure, sufficient animal testing, and the obvious absence of carcinogenic properties.

It must be recognized that insulation of buildings saves more than 100 times the environmental impacts associated with the production and disposal of the products used for insulation. Compared to that and the inherent uncertainties in the LCA, the differences between the investigated products are of minor environmental significance. The main conclusion demonstrated in the study is therefore that the quality and fitness of an insulation product is the most important aspect in the life cycle of insulation materials.

A two-part paper derived from this study will be published in *Int J LCA*. **Part 1** of the paper contains the project background, the goal and scope definition and three life cycle assessments for the three individual products, with a detailed inventory analysis, impact assessment, sensitivity analysis and interpretation. The actual comparison of the results from the three individual life cycle assessments is presented in **Part 2**. An attempt is made to answer the question of whether the biological products flax and paper wool are more environmentally preferable than the mineral product stone wool representing more traditional insulation materials.

New SETAC Europe Working Group – Announcement

SETAC Europe Working Group on LCA and Electricity Markets (LCA-EM)

The environmental consequences of electricity production frequently account for a major share of the total environmental burdens identified in product Life Cycle Assessment, across a broad variety of product types, and across a range of impact categories. Because of the rapid developments of the electricity supply system both on the technological as well on the system level, a 'simple' average modelling of energy supply as an input to basic industrial processes might be less appropriate in the future as it is today.

Our current electricity supply system faces significant structural changes. The liberalisation of electricity markets together with changing environmental policy requirements facilitates the implementation of new market mechanisms, like e.g. the trading of electricity on a spot market, CO₂-emission trading, or the trading of green electricity certificates. An increasing level of decentralised electricity generation forces us to address issues like 'virtual power plants', dispatching schemes, or security limits in LCA. The introduction of a CO₂-emission cap for specific sectors of a national economy, and the de-coupling of electricity as a physical good and its related environmental properties, which will be traded on different markets, are expected to have an influence on how electricity supply is dealt with in

LCA methodology. At the same time, the new mechanisms are expected to increase the need for communicating the environmental characteristics of electricity to market actors, which probably opens new areas of application for LCA, but most likely also result in new methodology and quality requirements.

The new SETAC Europe Working Group on LCA and Electricity Markets, which was launched during the SETAC Annual Meeting in Hamburg, will make an attempt to elaborate on how these new electricity market instruments work, and how current LCA methodology is affected. We are thus anticipating significant changes in our electricity supply system, and we aim at providing methodological guidance to the LCA practitioner on how to address the new context in his/her LCA study.

The LCA-EM Working Group is chaired by Wolfram Krewitt (wolfram.krewitt@dlr.de), the convenor of the group is Paolo Frankl (paolo.frankl@ecobilancio.com). Like for any other SETAC Working Group, there is no funding available so that we rely on the voluntary input from the experienced and enthusiastic experts working in the field. We warmly invite interested persons to contact us for further information. The next Working Group meeting will take place back-to-back to the SETAC Case Study Symposium in **Lausanne on December 5, 2003**.